

Horse Canyon Extension Lila Canyon Mine

Chapter 2 Soils

Volume 1 of 7

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TABLE OF CONTENTS

200	SOILS	Page -2-
210	Introduction	Page -2-
211	Premining Soil Resources	Page -2-
212	Topsoil Handling	Page -2-
220	Environmental Description	Page -2-
221	Prime Farmland Investigation	Page -2-
222	Soil Survey	Page -3-
223	Soil Characterization	Page -6-
224	Substitute Topsoil	Page -6-
230	Operation Plan	Page -6-
231	General Requirements	Page -6-
232	Topsoil And Subsoil Removal	Page -9-
233	Topsoil Substitutes and Supplements	Page -14-
234	Topsoil Storage	Page -15-
240	Reclamation Plan	Page -17-
241	General Requirements	Page -17-
242	Soil Redistribution	Page -18-
243	Soil Nutrients and Amendments	Page -19-
244	Soil Stabilization	Page -19-
250	Performance Standards	Page -20-
251	Topsoil, Subsoil Removal Maint. Redistribution	Page -20-
252	Topsoil Stockpiles	Page -20-

List of Plates

Plate 2-1	Soils Map
Plate 2-2	Detailed Soils Map of Mine Facilities Site
Plate 2-3	Soil Salvage and Replacement Map
Plate 2-4	Soils Transfer Map for Operational Use

List of Appendixes

Appendix 2-1	Prime Farm Land Determination
Appendix 2-2	Soil Descriptions NRCS
Appendix 2-3	Soil Survey (1998)
Appendix A1	Detailed Soil Survey Map
Appendix A2	Salvaged Soils Map

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R645-301-200. Soils.

210. Introduction.

211. Premining soil sources description.

212. Information in this chapter includes soil characteristics, chemical and physical analyses, and their interpretations for soils management and reclamation plans. Information is both qualitative and quantitative in nature.

Evaluation of suitable soil materials, stockpiling, and reclamation procedures are presented in section 220, 230, 240 and 250.

220. Environmental Description.

Environmental setting:

The proposed Lila Canyon Mine location is in eastern Emery County, Utah on the east side of the Price River drainage basin at the western edge of the Book Cliffs. The Book Cliffs are oriented northwest-southeast in the vicinity of the proposed permit area. The mine surface facilities would be located at the mouth of Lila Canyon, mostly on an alluvial pediment surface. Lithology is primarily sedimentary rocks of sandstone and shale. Below the steep slopes of the Book Cliffs are alluvial pediments and shale exposures. The elevation differences in the area of the mine site range from approximately 5,800 at the mouth of Lila Canyon to over 8,800 feet on top of Lila Point. Elevations of the proposed mine facilities site range from 5,800 feet to 6,500 feet.

The average annual precipitation in the area of the mine site is 12-14 inches with the majority of the precipitation occurring from October to March. The mean annual air temperature is 45-47 degrees F and the average frost-free period is 80 to 120 days. The basic vegetation is a pinyon-juniper and grass type.

221. Prime Farmland Investigation.

A Prime Farmland Investigation was conducted by Leland Sasser,

Soils Scientist for the USDA Natural Resource Conservation Service (NRCS) in January of 1998. Mr. Sasser confirmed that no such lands are present with the described permit area. This is due to the lack of a developed irrigation system on the arid soils present, as well as the high erodibility of soils present within the area. It has been determined that no alluvial valley floors are present on the proposed disturbed areas of the Lila Canyon Mine Project. This determination was made by the use of detailed soil surveys and site observations. Also, the order 3 intensity level soil survey by the National Resources Conservation Services shows no alluvial valley floors in the area. A copy of these negative determinations is included as Appendix 2-1.

222. Soil Survey.

222.100. An order 3 intensity level soil survey for Emery County is currently in progress by the USDA, National Resources Conservation Service (NRCS). Soil mapping at a scale of 1:24,000, along with map unit descriptions, has been provided by NRCS to cover the entire Lila Canyon Mine project area. This soil map is presented as Plate 2-1. The detail is suitable for general planning and evaluation purposes over the mining project area.

Since more specific information was needed for the area to be disturbed at the proposed mine facilities site; a detailed soil survey was conducted by Daniel Larsen, Soil Scientist, Environmental Industrial Services in August 1998. Additional information was collected at the portal fan site on June 15, 1999. The detailed soil survey report is presented in Appendix 2-3. A soils map, soil descriptions, and laboratory soil testing data are included. The detailed soils map for the mine facilities site (disturbed area) is presented in Plate 2-2.

222.200. Soil types for the proposed project area are identified on Plate 2-1 and in Appendix 2-3. At the mine facilities site the dominant soil is the Strych series. The order 3 intensity soil survey information provided by the Natural Resources Conservation Service identifies four soil map units at the mine surface facilities site:

BNE2 Strych very bouldery, fine sandy loam, 3

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to 20 percent slopes

BMD	Strych very stony fine sandy loam, 3 to 30 percent slopes
NGG2	Gerst-strych-badland complex, 30 to 70 percent slopes
RZH	Rock outcrop-Atchee-Rubbleland Complex

The detailed soil survey of the facilities site identifies six soil map units:

SBG - Strych boulder fine sandy loam, 5 to 15 percent slopes (grass)

VBJ - Strych very bouldery fine sandy loam 5 to 15 percent slopes (juniper)

XBS - Strych extremely bouldery sandy loam, 10 to 45 percent slopes

RBL - Rubbleland-Strych-Gerst complex, 20 to 70 percent slopes

DSH - Strych fine sandy loam variant, 3 to 8 percent slopes

RBT - Rock outcrop - Travessilla family complex.

These unit designations are specific to this inventory. The Travessilla family has been revised by NRCS and based the changes the Atchee series is more appropriate in Map Unit RBT (personal conversation with Leland Sasser. July, 1999).

Permit Area "B" Soils

Soils in Permit Area "B" include the following Soil Map Units identified

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in the Soil Survey of the Emery Area, Utah by the Natural Resource Conservation Services:

DHG2	Comodore-Datino Complex
DSG 2 (HUG)	Midfork-Tingey-Comodore Complex
GNA	Neto fine sandy loam
KXH	Podo-Rock outcrop Complex
MHE (MSC)	Podo sandy loam, 1 to 8 percent slopes
MRG	Vassilla-Rock outcrop-Gerst Association
MTH	Cabba-Guben-Rock outcrop Complex
MUE	Cabba-Podo-Doney Complex
NGG2	Gerst-Strych-Badland Complex
NVF2	Gerst-Rubbleland-Badland
NXC	Lazear-Rock outcrop Complex, High rainfall
RR	Rock outcrop
RWG	Rock outcrop-Rubbleland-Vassilla Complex
RZH	Rock outcrop-Atchee-Rubbleland Complex
UMF2	Guben-Pathead-Rabbitex Association
VOH	Guben-Rock outcrop Complex

222.300. Soil descriptions from the NRCS order 3 mapping are contained in Appendix 2-2. Soil descriptions from the detailed soil survey of the facilities site are given in Appendix 2-3.

The soils at the proposed Lila Canyon mine facilities site have formed dominantly in deep, stony and bouldery deposits on an alluvial fan and adjacent mountain toe slopes under a semi-arid climate. Rock fragments (gravel to boulders) are composed almost entirely of sandstone.

Notable features related to soils at the site are the high percentage of stones and boulders that are present on the

surface and the relatively hot and dry site conditions. Minimal topsoil development and an accumulation of carbonates in the subsoil are typical characteristics of these soils along with a high rock fragment content. Soil textures are typically fine sandy loam or sandy loam. Thin layers of sandy clay loam and loamy sand are intermittently present.

The dominant soils are well drained and have moderately rapid permeability. Soil erosion potential is moderately low over most of the area, but ranges from low to severe (on shale exposures). Rooting depths observed were mostly at 30 to 48 inches.

222.400 Present and potential productivity determinations of the existing soils conducted by Mr. George Cook of the NRCS in the summer of 1998 are presented in Appendix 3-2.

223. The soil survey was conducted according to the standards of the National Cooperative Soil Survey as described in the Soil Survey Manual (Soil Survey Staff, 1993), the National Soil Survey Handbook, (soil Survey Staff, 1993), and Keys to Soil Taxonomy, seventh edition (Soil Survey Staff, 1996).

224 Soil inventories indicate that no borrow area will be needed for substitute topsoil. There is an adequate amount of suitable soil as indicated by root distribution and soil characteristics over the proposed area to be disturbed.

230. Operation Plan.

231. General Requirements.

231.100 In reference to topsoil in this plan, it is considered to be the soil down to a maximum depth of 18". The typically dark colored A horizon often referred to as topsoil is very thin (< 6 inches) under the environmental conditions of the project site. Topsoil generally consists of the A and B horizon materials that have suitable characteristics for plant growth and show natural rooting present within the soil. Of the salvageable soil

identified, the upper 6 to 12 inches is the most suitable. Below this depth, there is generally an increase in carbonates and rock fragments. However, this layer supports plant roots and is not considered as substitute topsoil in this case.

Where topsoil is to be salvaged, the soils will be removed with one or more of the following types of equipment: crawler-tractor, grader, front-end loader, and/or trackhoe. A soil scientist will provide on-site consultation during the topsoil removal process to maximize harvest of quality topsoil. Topsoil material will be hauled by truck and stockpiled at designated storage areas located near, but away from the mine yard. This will allow the soil materials to be located away from mining activities to minimize the potential impacts from mine-related activities. The storage areas will be located away from any drainage areas. Drainage ditches will be located along the sides of the stockpiles to divert drainage away from the stockpile surface. Drainage will be diverted by ditches to the downslope end of the stockpile and will be treated by silt fences prior to entering the undisturbed drainage. Refer to Plates 5-2 and 5-7 for the location of the proposed topsoil storage area. Refer to Appendix 7-4 for details of the drainage control designs proposed for these alternate sediment control areas (ASCAs).

During stripping and handling the soils will be in a loose or friable condition. If the soil sticks to the equipment, the soil will be allowed to dry to a friable state prior to removal. If the soil is too dry and hard to handle, water will be added until the soil is wetted to a loose and friable condition.

The stockpiled material will be loosely piled and have an irregular, pitted surface to help retain runoff from precipitation events and to reduce erosion.

The stockpile will be seeded and mulched during the first favorable period for revegetation. Species selected would give an effective, quick-growing vegetative cover to protect it from wind and water erosion. The seed mix to be utilized for stockpile revegetation is presented in Table 3-4. If supplemental seeding is needed, it will be done the following year. If seeding does not immediately follow topsoil pile

construction, the pile will be roughened again immediately prior to seeding. Side slopes will be monitored for erosion and will be repaired if erosion appears to be excessive.

Undisturbed islands located within the disturbed area will not be disturbed unless the mine reclamation plan is amended to allow for the disturbance. The islands will be signed as undisturbed to help protect them from any disturbance.

231.200. Soil inventories indicate that no topsoil substitutes will be needed.

231.300. Topsoil will be tested as per Section 243. If testing identifies a potential problem, additional samples may be collected to determine the extent and severity of the problem.

Vegetation monitoring will compare the results of plant growth on the replaced topsoil with the growth on the in-place soil materials. If there is a distinct difference between the two areas, the Operator will consult with the DOGM to determine the nature of the problem and will make corrections as recommended for improvement.

231.400. Construction of the topsoil storage site will begin by removing any large boulders and existing vegetation. Diversion ditches will be installed after the stockpiles are in place to channel drainage away from the stockpiles. Once the topsoil stockpile has been created with the material removed during construction of the proposed mine site, it will be reseeded and will remain in place until final reclamation occurs.

The surface of the stockpile will be left rough and irregular to increase retention of rainfall and snow melt. Seeding will be done following placement of the topsoil, and between Sept. 15 and Jan. 15, to take advantage of winter moisture. If seeding does not immediately follow topsoil pile construction, the pile will be roughened again immediately prior to seeding.

A silt fence or berm/ditch configuration will be installed at the perimeter of the pile to protect it from water erosion and vehicular traffic. Maintenance of the topsoil pile, during the life of the mining operation, will consist of: seeding the new

stockpile, reseeding if erosion or other elements cause a loss of vegetation, and maintenance of the ditches and/or silt fence in the stockpile areas.

232. Topsoil and Subsoil Removal

232.100

Prior to topsoil removal, eight five gallon buckets of screened 1/4" cryptobiotic soil will be recovered and stored in a cool dry place for redistribution on the topsoil pile. Topsoil material will be removed from those areas of the mine yard where material will be excavated in order to achieve final yard configuration and which have been identified as suitable topsoil for reclamation based on the soil survey. This includes the access road to and around the topsoil pile. This material will be used to construct a berm around the topsoil pile.

The following volumes represent soil resources that may be available for salvage, storage and subsequent redistribution during reclamation. The actual amount salvaged will be reported to DOGM following topsoil removal and stockpiling operations.

AVAILABLE SOIL RESOURCES

Map Unit	Potential Salvage Depth In.	Potential Acres	Potential Estimated Volume YD3	Actual Salvage Depth In.	Actual Salvaged Acres	Actual Salvaged Top Soil YD3
SBG	48	11.83	76343	18	11.25	26873
VBJ	30	9.62	38801	18	4.51	9526
XBS	12	12.09	19505	12	4.78	7351
DSH	40	1.56	8389	18	1.40	3291
RBL	8	9.34	10046	8	2.59	2709
RBT	6	3.79	3057	6	0.77	486
TOTAL ⁽²⁾		48.23	156141		25.30	50236
Bank to Loose Cubic Yards *1.18 (Amount topsoil pile is designed to hold.)						⁽¹⁾ 59278

(1) An additional 800 yd³ will come from the access road around the topsoil pile. This material will be placed in the berm around the topsoil pile.

(2) The 48.23 acres was taken from a soil survey and does not accurately reflect the operators intention to include 42.6 acres of disturbance within the disturbed area boundary.

The actual topsoil salvage will consist of removing a surface layer up to 18 inches thick over the disturbed area. If shale is encountered within 18 inches only the soil above the shale will be salvaged. (Plate 2-3). This would cover about 25 acres where soil would be salvaged and stored in the topsoil stockpile.

Total volumes of soil stored in the topsoil pile would be approximately 50,000 bank cubic yards. Removal of stones and boulders would be considered in volume estimates where they are part of the soil layer removed.

The stockpile has been sized to allow for bulking or swell of the soil as it is removed from the bank state to the loose state. A bulking number of 1.18 has been used. The area allowed for topsoil storage is 50,000 bank cubic yards x 1.18 which equals 60,000 loose cubic yards to be placed on the topsoil pile.

Boulders of approximately three feet in diameter and larger will be separated from the topsoil and piled or placed at appropriate locations such as adjacent to roads, pads etc. No attempt will be made to collect the large boulders into common piles. Boulders above ground level are in addition to topsoil volumes and may account for approximately 10,000 cubic yards.

UEI is not stockpiling large stones "boulders". Boulders will be pushed to the side and left during construction and then upon reclamation the boulders will be pushed back into the approximate location from which they came. Rocks of 36" or less will be stored in the topsoil pile with the soil and will be redistributed with the soil.

The approximate 60,000 loose cubic yards of topsoil will be stored in a topsoil pile as shown on Plate 5-2. This topsoil pile will be approximately 246' long and 146' wide with 2:1 slopes. The height of topsoil pile needed is approximately 26 feet. The pile as designed has the capability of storing well over the required 60,000 cubic yards. See Figure 1 for topsoil pile calculations.

Soil from the proposed exhaust fan site near the coal outcrop may not be stored in the topsoil stockpile. At this small site detached from the main facilities, available soil would probably be stored at the edge of the area to be disturbed for fan installation. This topsoil would be bermed and seeded to protect the soil reserve until reclamation.

The sequence for topsoil removal in general, would be starting from the lower elevations of the site and working up slope. Surface disturbance may not be required on all of the acreage identified as the disturbed area. After removal of the topsoil to be salvaged, underlying soil materials will be used as fill or left in place.

All practical precautions will be taken during design, construction, and reclamation to assure that shales or shale material will not be pushed over the top of or mixed with subsoils. Contamination of the subsoil with shale will not be permitted. The certified soils specialist, or by a person who is determined qualified by the operator and the Division, on site during the construction and reclamations phases will carefully observe the construction and reclamation phases and prevent to the extent possible the mixture of shales and subsoils. Additional topsoil removal, in excess of 18" minimum, may be necessary to prevent the shale from contaminating the subsoil.

- 232.200. Since topsoil is sufficient this section does not apply.
- 232.300. The surface soil down to 18" or to the shale which ever is the least will be removed and stored.
- 232.400. This section is addressed in 232.700.

Lila Canyon Topsoil Calculations

Pile Elevation In Feet	Pile Length In Feet	Pile Width In Feet	Volume L X W CYDS	Volume Ends CYDS	Total Volume Cumulative Cubic Yards
	350	250	3240.74		3240.74
1	346	246	3152.44	22.07	6415.26
2	342	242	3065.33	21.78	9502.37
3	338	238	2979.41	21.48	12503.26
4	334	234	2894.67	21.19	15419.11
5	330	230	2811.11	20.89	18251.11
6	326	226	2728.74	20.59	21000.44
7	322	222	2647.56	20.30	23668.30
8	318	218	2567.56	20.00	26255.85
9	314	214	2488.74	19.70	28764.30
10	310	210	2411.11	19.41	31194.81
11	306	206	2334.67	19.11	33548.59
12	302	202	2259.41	18.81	35826.81
13	298	198	2185.33	18.52	38030.67
14	294	194	2112.44	18.22	40161.33
15	290	190	2040.74	17.93	42220.00
16	286	186	1970.22	17.63	44207.85
17	282	182	1900.89	17.33	46126.07
18	278	178	1832.74	17.04	47975.85
19	274	174	1765.78	16.74	49758.37
20	270	170	1700.00	16.44	51474.81
21	266	166	1635.41	16.15	53126.37
22	262	162	1572.00	15.85	54714.22
23	258	158	1509.78	15.56	56239.56
24	254	154	1448.74	15.26	57703.56
25	250	150	1388.89	14.96	59107.41
26	246	146	1330.22	14.67	60452.30
27	242	142	1272.74	14.37	61739.41
28	238	138	1216.44	14.07	62969.93
29	234	134	1161.33	13.78	64145.04
30	230	130	1107.41	13.48	65265.93
31	226	126	1054.67	13.19	66333.78
32	222	122	1003.11	12.89	67349.78
33	218	118	952.74	12.59	68315.11
34	214	114	903.56	12.30	69230.96
35	210	110	855.56	12.00	70098.52

Figure 1

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232.410. This section is addressed in 232.700.

232.420. This section is addressed in 232.700.

232.500. Topsoil will be considered as the upper 18 inches of soil in most cases. Subsoil ranging in thickness from 12 to 30 inches from cutslope sites will be used as fill material for site development and replaced in an approximate original sequence during reclamation.

In order to verify subsoil depths, soil pedestals or other survey methods will be utilized for proper identification. Pedestals of undisturbed soil will be left at selected locations as reference points to show the type of soil thickness that has been removed from the slope cut areas. Records will be maintained to keep track of what materials are removed and where they are placed (topsoil storage or fill). Pedestals will vary in size depending on depth of cut. They will be designed to maintain stability of the soil column.

These soil pedestals may have to be removed once they have been properly logged to facilitate the mining operation.

An As-Built map will be prepared to show where soil materials have been used as fill material. This will include thickness records for topsoil, subsoil, and substrata. This information will be used to verify subsoil salvage depths according to Salvageable Soils Map Appendix A-2 of Appendix 2-3. This as built map will be incorporated into the Mining Reclamation Plan.

If shale is encountered in the slope cuts, the shale material will be separated from the other soil and returned to or near its original position upon reclamation.

Subsoils that are stored as pad material will be protected by a surface that is covered by asphalt, concrete, or gravel. The subsoil material will be under parking areas, buildings, roads, and storage sites. Graveled areas will have an impervious membrane placed between the subsoil and gravel.

Precautions will be taken to avoid contamination. In the unlikely event visual observations indicate that subsoil has become contaminated from oil and grease, salts, or other visual contaminants, the contaminated soil will be disposed of at a sanitary landfill site (probably East Carbon).

232.600. Topsoil will be removed from excavation areas and stockpiled prior to construction activity. Vegetation and boulders that might interfere with topsoil salvage will be removed prior to removal and stockpiling of the topsoil.

232.700. It is anticipated that topsoil can be salvaged on areas to be disturbed. Approximate thickness of subsoil by Soil Map Unit are: SBG - 30 inches, DSH - 22 inches, and VBJ - 12 inches.

232.710. Soil removal from some local sites may be difficult due to rockiness and steep slopes. The area between the rock slopes and the ROM coal stockpile is an area of concern. In the area between the rock slopes and ROM coal stockpile the disturbance is minimal. The topsoil will not be removed from this area due to steep slopes. To protect this area from coal contamination the conveyor will be enclosed. Jersey Barriers will be installed to prevent the coal stockpile from encroaching this area. Topsoil will be removed in all areas of disturbance except for the area between the ROM coal pile and the rock slopes where either one or two bents will be constructed. Available underlying soils will be salvaged from stony disturbed areas. Areas too steep and rocky for equipment and where it would be unsafe or impractical for construction activities will not be included in the site development plan.

232.720. No substitute soil materials will be needed.

233. Topsoil Substitutes and Supplements.

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- 233.100.** Soil inventories indicate that no substitute topsoil material will be necessary. Available soil material on the site is adequate for reclamation purposes.
- 233.200** Preliminary inventories show that no topsoil borrow area is needed.
- 233.300.** This section is addressed in 233.400.
- 233.310.** This section is addressed in 233.400.
- 233.320.** This section is addressed in 233.400.
- 233.330.** This section is addressed in 233.400.
- 233.340.** This section is addressed in 233.400.
- 233.400** Soil Inventories show that no topsoil or topsoil substitute borrow area will be needed. Adequate amounts of suitable soil for plant growth are present based on root distribution and soil characteristics.

234. Topsoil Storage.

- 234.100.** It will not be possible to redistribute the topsoil immediately. Therefore, the topsoil will be stockpiled for the purpose of final reclamation of the mine site. The rock storage areas are shown on Plate 5-2.

Access to the fan site will be from inside the mine. Once the portals have been made safe, salvageable topsoil will be collected by equipment and placed into a topsoil storage berm located below the fan house. To minimize the possibility of rock dust contamination, topsoil will not be stored directly in front of the discharge of the fan. Refer to the Surface Area map Plate 5-2 for the approximate location of this topsoil berm. The topsoil berm will be stabilized with vegetation to prevent

erosion. As much as practical, the same vegetation techniques used on the main topsoil pile will be utilized on the fan topsoil berm. Silt fence will be utilized to prevent the topsoil from leaving the site.

Presently there is not a subsoil stockpile required for this project, therefore, details are not provided.

234.200. Section 232.100 contains information on the topsoil stockpile.

234.210. The stockpile site selected is on the Strych soil. It is a well drained and stable site on cobbly alluvium.

234.220. The stockpile will be located and protected to avoid contamination. Unacceptable compaction will not be permitted. In areas where undisturbed soils are in close proximity to coal mining or reclamation activities a 20 foot buffer zone will be delineated by "Undisturbed Area" signs. Quarterly inspections will be made to insure there is not an accumulation of coal dust or coal related debris. In the event coal dust is observed in excess of one inch on undisturbed areas, a vacuum truck will be employed to clean up residual coal dust and fines.

234.230. The stockpile will be mulched and seeded with the seed mix presented in Table 3-4. Up to 1% by volume of the sifted soil crusts will be added to each load of Wood fiber mulch applied to the top soil pile. The slopes will have an irregular, pitted surface to help retain precipitation and minimize runoff. Silt fencing will be placed at the base of the stockpile.

234.240. Plans are to leave the topsoil in place for the life of the mine.

234.300. These regulations are not applicable to the action described within this permit document.

234.310. These regulations are not applicable to the action

described within this permit document.

- 234.320.** These regulations are not applicable to the action described within this permit document.

240. Reclamation Plan.

241. Reclamation of the proposed disturbed area will begin once all surface facilities and structures have been demolished and removed. Disturbed areas will be restored to approximate original contour. Disturbed areas will be re-graded using pad material. Subsoil from Soil Map Units SBJ, DSH, and VBJ that are used as construction fill will be identified and used during reclamation as root zone subsoils. This information will be collected during the original grading operation and incorporated into the As-Built drawing referred to in Section 232.500. The grading sequence with regards to subsoil will be as follows:

- a. Grade all areas where no subsoil is being stored.
- b. Replace subsoil on areas from which it was removed.
- c. Rip the subsoil to a minimum of 16 inches.
- d. Replace topsoil.
- e. Replace boulders
- f. Gouge the topsoil.

After the disturbed areas have been recontoured and retopsoiled they can then be revegetated.

Sediment control during reclamation will be met by continued use of the sediment pond located below the yard area. All main culverts and an adequate amount of fill to maintain existing headwalls will be left intact during this reclamation phase.

After approximate original contour (AOC) is achieved, the surface will be prepared. Where practical, the disturbed area will be scarified prior to soil redistribution. The rippers found on the rear of a cat will be used to scarify the disturbed area. The total surface where practical will be ripped on a maximum spacing of 6' to a depth of 16 inches. Pocking, after topsoil redistribution, will be the primary method used to roughen the surface. Pocking consists of imprinting the surface with a pattern of depressions as per Figure 1 in Appendix 5-8. The purpose of these pocks is to capture and retain water (moisture), and provide a cradle for seedlings and other plant materials. To enhance the ability of the soil to absorb moisture, best

technology currently available at the time of reclamation will be applied to the soil surface.

In order to regenerate naturally existing soil organisms and assist in reactivating soil activity, an inoculum will be applied to the soil to reestablish soil bacteria, microhorizia and mycelium. To enhance soil microbial establishment and promote more rapid stabilization of the soil the seed mixture (as listed in Chapter 3) will be either hand broadcast over the area or sprayed using a hydromulcher. A wood fiber mulch will be hydro sprayed over the seed bed, then the surface will be sprayed with a tackifier. See Appendix 5-8.

242. Soil Redistribution.

242.100 Topsoil materials that were previously stockpiled will be redistributed on the same areas in a thickness which approximates the reclaimed thickness on the scarified, postmining regraded surface. For example if 8" of topsoil is removed from one area and 16' from another area reasonable efforts will be made to replace 8" where the 8" was removed from and 16" where the 16" was removed from. (See Plate 2-3 Soil Salvage and Replacement). The material will be hauled to the regraded area by dump truck or loader. The material will be placed using a front-end loader, crawler tractor, and/or trackhoe on steeper slopes and/or crawler tractor on the flat areas. After the backfill is placed to approximate original contour and the topsoil is respread, the site will be revegetated. Boulders will be replaced to achieve a near natural surface condition. The backfill will include subsoil material which was used as fill during the operational phase. Using as-built drawings, refer to 232.500, the subsoil will be replaced to its approximate original position prior to replacement of topsoil from the topsoil stockpile. Subsoil will be replaced in its approximate position in the reconstructed soil profile.

242.110. This section has been addressed in 242.100.

242.120. This section has been addressed in 242.100.

242.130. This section has been addressed in 241.

242.200. This section has been addressed in 242.100.

242.300. This section has been addressed in 242.100.

242.310. This section has been addressed in 242.100.

242.320. This section has been addressed in 242.100.

- 243. Soil Nutrients and Amendments.** Nutrients and soil amendments will be applied to the redistributed material if deemed necessary by assessment of the laboratory analyses. Nutrients and amendments will be added, to make the redistributed soil similar to the undisturbed soils and aid in establishment of the vegetative cover. The nutrients will be added by hydro seeding.

The topsoil will be sampled and tested prior to replacement. Sampling will either be performed by a Certified Soil Scientist or by a person who is determined qualified by the operator and the Division. Grab samples will be collected from the stockpile after its height is reduced to 10 feet at the deepest end. Four or five grab samples should be sufficient to determine what the effects of darkness, compaction, and sterility have been on the fertility of the topsoil. The grab samples will be analyzed for nitrogen, phosphate and potassium. Fertilizer, if needed, will be applied to the topsoil prior to seeding and mulching activities.

244. Soil Stabilization.

244.100 Exposed surface areas will use vegetative stabilization where practical to control erosion and fugitive dust. Revegetative efforts (including regrading, topsoiling, fertilizing and mulching) will be conducted prior to the end of October.

244.200 After approximate original contour (AOC) is achieved, the surface will be prepared. Pocking will be the primary method used to roughen the surface. Pocking consists of imprinting the surface with a pattern of depressions as per Figure 1 in Appendix 5-8. The purpose of these pocks is to capture and retain water (moisture), and provide a cradle for seedlings and other plant materials.

In the event that soil crusts form on the topsoil stockpile, the Permittee will add up to 2 ounces of the sifted soil crusts to

each load of Wood fiber mulch which will be applied to the reclaimed areas that have been regraded and covered by topsoil or substitute topsoil. (See Appendix 5-8).

244.300. Any rills and gullies of an excessive nature, which form on regraded and retopsoiled areas and disrupt the approved postmining land use or cause or contribute to a violation of water quality standards for receiving streams, will be filled, regraded or stabilized. The area will then be reseeded.

244.310. This section has been addressed in 244.300.

244.320. This section has been addressed in 244.300.

250. Performance Standards.

251. All topsoil, subsoil and topsoil substitutes or supplements will be removed, maintained and redistributed according to the plan given under sections 230 and 240.

252. All stockpiled topsoil, subsoil and topsoil substitutes or supplements will be located, maintained and redistributed according to plans given under sections 230 and 240.